

CLAIMS:

1. A method for making a fibrous nonwoven mat facer;
 - a) dispersing fibers having an average fiber diameter of 13 +/- 2 microns in an aqueous dispersion,
 - b) draining said dispersion through a moving forming screen to form a wet fibrous web,
 - c) applying an aqueous resin binder to the wet web and removing excess binder to produce the desired binder content in the wet web, the aqueous binder comprising a mixture of water and a resin formed from a homopolymer or a copolymer of polyacrylic acid and a polyol; and
 - d) drying the wet web and at least partially curing the resin in the binder to form a resin bound fibrous non woven mat, wherein;
2. The method according to claim 1, wherein the binder is substantially free of phenol, formaldehyde and urea.
3. The method according to claim 1, wherein the average molecular weight of the polyacrylic acid polymer is about 3,000 or less.
4. The method according to claim 1, wherein the polyol is triethanolamine.
5. The method according to claim 2, wherein the polyol is triethanolamine.
6. The method according to claim 3, wherein the polyol is triethanolamine.
7. The method according to claim 3, wherein the polyol is triethanolamine and the aqueous dispersion comprises glass fibers having an average fiber diameter of about 13 +/- 1.5 micron.
8. The method according to claim 7 wherein the average fiber diameter is 13 +/- 1 micron.
9. The method according to claim 8 wherein the majority of the glass fibers are about 0.75 inch long.

10. The method according to claim 9 wherein the binder content in the finished dry mat is within the range of about 5 to about 30 wt. percent.

11. The method of claim 10 wherein the binder content is within the range of about 10 to about 25 wt. percent.

12. The method according to claim 10 wherein the binder content is within the range of about 10 to about 20 wt. percent.

13. The method according to claim 1, wherein the binder further comprises a one or more additives selected from the group consisting of pigments, fillers, fire retardants, biocides, anti-fungal agents and catalysts, such as a phosphorus-containing catalyst, and mixtures thereof.

14. The method according to claim 1 wherein the glass fibers have an average fiber diameter of about 13 +/- 1.5 microns.

15. The method according to claim 14 wherein the majority of the fibers have a length of about 0.7 inch and an average diameter of about 13 +/- 1 micron.

16. A method for making a fibrous nonwoven facer mat comprising;

a) dispersing glass fibers having an average fiber diameter of about 13 +/- 1.5 microns in an aqueous mixture to form a fiber dispersion,

b) draining said mixture through a moving forming screen to form a wet fibrous web,

c) applying an aqueous resin binder to the wet web and removing excess binder to produce the desired binder content in the wet web, wherein the aqueous resin binder comprises a mixture of water and a resin formed from a homopolymer or a copolymer of polyacrylic acid and a polyol and being present in the finished dry mat in amounts between about 10 and about 25 wt. percent based on the weight of the dry mat, and

d) drying the wet web and at least partially curing the resin in the binder to form a resin bound fibrous nonwoven mat.

17. The method according to claim 16 wherein the average fiber diameter of the fibers is about 13 +/- 1 micron.

18. The method according to claim 17 wherein the length of the majority of the fibers are between about 0.5 inch and about 1.2 inches.

19. The method according to claim 18 wherein the binder content of the dry mat is in the range of about 10 to about 20 percent.

20. The method according to claim 19 wherein the majority of the glass fibers are about 0.7 inch long.

21. The method according to claim 20 wherein the binder content of the dry mat is about 15 +/- 3 wt. percent.

22. The method according to claim 16, wherein the average molecular weight of the polyacrylic acid polymer is about 3,000 or less.

23. The method according to claim 17, wherein the average molecular weight of the polyacrylic acid polymer is about 3,000 or less.

24. The method according to claim 18, wherein the average molecular weight of the polyacrylic acid polymer is about 3,000 or less.

25. The method according to claim 19, wherein the average molecular weight of the polyacrylic acid polymer is about 3,000 or less.

26. The method according to claim 20, wherein the average molecular weight of the polyacrylic acid polymer is about 3,000 or less.

27. The method according to claim 21, wherein the average molecular weight of the polyacrylic acid polymer is about 3,000 or less.

28. The method according to claim 16, wherein the polyol is triethanolamine.

29. The method according to claim 17, wherein the polyol is triethanolamine.

30. The method according to claim 18, wherein the polyol is triethanolamine.

31. The method according to claim 19, wherein the polyol is triethanolamine.
32. The method according to claim 20, wherein the polyol is triethanolamine.
33. The method according to claim 21, wherein the polyol is triethanolamine.
34. The method according to claim 22, wherein the polyol is triethanolamine.
35. The method of claim 16 wherein the binder further comprises a one or more additives selected from the group consisting of pigments, fillers, fire retardants, biocides, anti-fungal agents and catalysts, such as a phosphorus-containing catalyst, and mixtures thereof.
36. The method of claim 17 wherein the binder further comprises a one or more additives selected from the group consisting of pigments, fillers, fire retardants, biocides, anti-fungal agents and catalysts, such as a phosphorus-containing catalyst, and mixtures thereof.
37. The method of claim 19 wherein the binder further comprises a one or more additives selected from the group consisting of pigments, fillers, fire retardants, biocides, anti-fungal agents and catalysts, such as a phosphorus-containing catalyst, and mixtures thereof.
38. The method of claim 20 wherein the binder further comprises a one or more additives selected from the group consisting of pigments, fillers, fire retardants, biocides, anti-fungal agents and catalysts, such as a phosphorus-containing catalyst, and mixtures thereof.
39. The method of claim 21 wherein the binder further comprises a one or more additives selected from the group consisting of pigments, fillers, fire retardants, biocides, anti-fungal agents and catalysts, such as a phosphorus-containing catalyst, and mixtures thereof.
40. The method of claim 27 wherein the binder further comprises a one or more additives selected from the group consisting of pigments, fillers, fire retardants, biocides, anti-fungal agents and catalysts, such as a phosphorus-containing catalyst, and mixtures thereof.

41. The method of claim 28 wherein the binder further comprises a one or more additives selected from the group consisting of pigments, fillers, fire retardants, biocides, anti-fungal agents and catalysts, such as a phosphorus-containing catalyst, and mixtures thereof.
42. The method of claim 33 wherein the binder further comprises a one or more additives selected from the group consisting of pigments, fillers, fire retardants, biocides, anti-fungal agents and catalysts, such as a phosphorus-containing catalyst, and mixtures thereof.
42. The method of claim 1 wherein at least portions of a surface of the wet, bindered web is coated with an aqueous hydrophilic mixture prior to drying.
43. The method of claim 1 wherein at least portions of a surface of the dry mat is coated with a hydrophilic mixture followed by further drying.
44. The method of claim 8 wherein at least portions of a surface of the wet, bindered web is coated with an aqueous hydrophilic mixture prior to drying.
45. The method of claim 8 wherein at least portions of a surface of the dry mat is coated with a hydrophilic mixture followed by further drying.
46. The method of claim 13 wherein at least portions of a surface of the wet, bindered web is coated with an aqueous hydrophilic mixture prior to drying.
47. The method of claim 13 wherein at least portions of a surface of the dry mat is coated with a hydrophilic mixture followed by further drying.
48. The method of claim 15 wherein at least portions of a surface of the wet, bindered web is coated with an aqueous hydrophilic mixture prior to drying.
49. The method of claim 15 wherein at least portions of a surface of the dry mat is coated with a hydrophilic mixture followed by further drying.
50. The method of claim 16 wherein at least portions of a surface of the wet, bindered web is coated with an aqueous hydrophilic mixture prior to drying.
51. The method of claim 16 wherein at least portions of a surface of the dry mat is coated with a hydrophilic mixture followed by further drying.

52. The method of claim 17 wherein at least portions of a surface of the wet, bindered web is coated with an aqueous hydrophilic mixture prior to drying.

53. The method of claim 17 wherein at least portions of a surface of the dry mat is coated with a hydrophilic mixture followed by further drying.

54. The method of claim 21 wherein at least portions of a surface of the wet, bindered web is coated with an aqueous hydrophilic mixture prior to drying.

55. The method of claim 21 wherein at least portions of a surface of the dry mat is coated with a hydrophilic mixture followed by further drying.

56. The method of claim 27 wherein at least portions of a surface of the wet, bindered web is coated with an aqueous hydrophilic mixture prior to drying.

57. The method of claim 27 wherein at least portions of a surface of the dry mat is coated with a hydrophilic mixture followed by further drying.

58. The method of claim 33 wherein at least portions of a surface of the wet, bindered web is coated with an aqueous hydrophilic mixture prior to drying.

59. The method of claim 33 wherein at least portions of a surface of the dry mat is coated with a hydrophilic mixture followed by further drying.

60. The method of claim 35 wherein at least portions of a surface of the wet, bindered web is coated with an aqueous hydrophilic mixture prior to drying.

61. The method of claim 35 wherein at least portions of a surface of the dry mat is coated with a hydrophilic mixture followed by further drying.

62. A fibrous nonwoven mat comprising glass fibers having an average fiber diameter of about 13 +/- 2 microns, the majority of the fibers having a length in the range of about 0.4 to about 1.2 microns, the fibers in the web being bound together by about 5 to about 30 weight percent of a binder that is at least partially cured and comprises before drying and curing a homopolymer or a copolymer of polyacrylic acid and a polyol.

63. The mat according to claim 62, wherein the average molecular weight of the polyacrylic acid polymer is about 3,000 or less.

64. The mat according to claim 62, wherein the polyol is triethanolamine.
65. The mat according to claim 63, wherein the polyol is triethanolamine.
66. The mat of claim 62 wherein the average fiber diameter is about 13 +/- 1.5 microns.
67. The mat of claim 62 wherein the average fiber diameter is about 13 +/- 1 micron.
68. The mat of claim 63 wherein the average fiber diameter is about 13 +/- 1.5 microns.
69. The mat of claim 63 wherein the average fiber diameter is about 13 +/- 1 micron.
70. The mat of claim 65 wherein the average fiber diameter is about 13 +/- 1.5 microns.
71. The mat of claim 65 wherein the average fiber diameter is about 13 +/- 1 micron.
72. The mat of claim 62 wherein the binder content of the mat is in the range of about 10 to about 20 weight percent.
73. The mat of claim 63 wherein the binder content of the mat is in the range of about 10 to about 20 weight percent.
74. The mat of claim 65 wherein the binder content of the mat is in the range of about 10 to about 20 weight percent.
75. The mat of claim 68 wherein the binder content of the mat is in the range of about 10 to about 20 weight percent.
76. The mat of claim 69 wherein the binder content of the mat is in the range of about 10 to about 20 weight percent.
77. The mat of claim 62 further including one or more of the group consisting of a pigment, a colorant, a filler, a fire- retardant, a biocide, an anti-fungal material and mixtures thereof.
78. The mat of claim 63 further including one or more of the group consisting of a pigment, a colorant, a filler, a fire- retardant, a biocide, an anti-fungal material and mixtures thereof.

79. The mat of claim 65 further including one or more of the group consisting of a pigment, a colorant, a filler, a fire- retardant, a biocide, an anti-fungal material and mixtures thereof.

80. The mat of claim 68 further including one or more of the group consisting of a pigment, a colorant, a filler, a fire- retardant, a biocide, an anti-fungal material and mixtures thereof.

81. The mat of claim 69 further including one or more of the group consisting of a pigment, a colorant, a filler, a fire- retardant, a biocide, an anti-fungal material and mixtures thereof.

82. The mat of claim 74 further including one or more of the group consisting of a pigment, a colorant, a filler, a fire- retardant, a biocide, an anti-fungal material and mixtures thereof.

83. The mat of claim 75 further including one or more of the group consisting of a pigment, a colorant, a filler, a fire- retardant, a biocide, an anti-fungal material and mixtures thereof.

84. The mat of claim 76 further including one or more of the group consisting of a pigment, a colorant, a filler, a fire- retardant, a biocide, an anti-fungal material and mixtures thereof.

85. The mat of claim 62 wherein at least a portion of a surface of the mat contains a hydrophilic material thereon.

86. The mat of claim 63 wherein at least a portion of a surface of the mat contains a hydrophilic material thereon.

87. The mat of claim 65 wherein at least a portion of a surface of the mat contains a hydrophilic material thereon.

88. The mat of claim 68 wherein at least a portion of a surface of the mat contains a hydrophilic material thereon.

89. The mat of claim 69 wherein at least a portion of a surface of the mat contains a hydrophilic material thereon.

90. The mat of claim 74 wherein at least a portion of a surface of the mat contains a hydrophilic material thereon.

91. The mat of claim 75 wherein at least a portion of a surface of the mat contains a hydrophilic material thereon.

92. The mat of claim 76 wherein at least a portion of a surface of the mat contains a hydrophilic material thereon.

93. The mat of claim 82 wherein at least a portion of a surface of the mat contains a hydrophilic material thereon.

94. The mat of claim 83 wherein at least a portion of a surface of the mat contains a hydrophilic material thereon.

95. The mat of claim 84 wherein at least a portion of a surface of the mat contains a hydrophilic material thereon.